

A Radiation Hardened Compact Multi-Channel DAC (RH-DAC)

Completed Technology Project (2012 - 2014)



Project Introduction

This project seeks to design, fabricate and test a prototype of a radiation hardened, compact, low-power Multi-channel Digital-to-Analog Converter (RHDAC) application specific integrated circuit (ASIC) for miniaturized instrument electronics. The device will contain multiple digital-to-analog converter channels and a selectable serial interface and low-power consumption per channel.

We seek to develop a radiation hardened, compact, low-power Multi-channel Digital-to-Analog Converter (RHDAC) application specific integrated circuit (ASIC) for miniaturized instrument electronics. This project will address the need for space worthy, compact multi-channel data converters to reduce the size, mass and power of instrument electronics. The ASIC features are science driven based on applications in a realistic space environment such as detector threshold setting, current bias circuits and voltage stepping in high-voltage power supplies. It directly addresses the goal of reducing power, mass and volume for highly resource-constrained instruments. The main objective is to design, fabricate and test a radiation hardened multi-channel digital-to-analog converter ASIC that will enable and advance miniaturized instrument electronics.

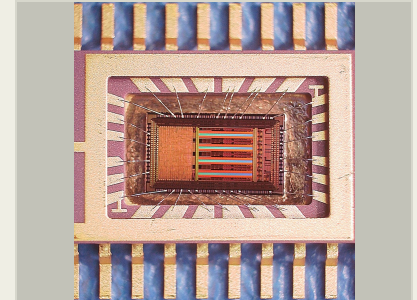
Anticipated Benefits

Compact Radiation Belt Explorer (CeREs) CubeSat

Extended Range Laser Altimeter (ERLA) for Instrument Concepts for Europa Exploration (ICEE)

EXO CubeSat

Neutro Gamma-ray Spectrometer (NGS) instrument



RH-DAC10 die photo

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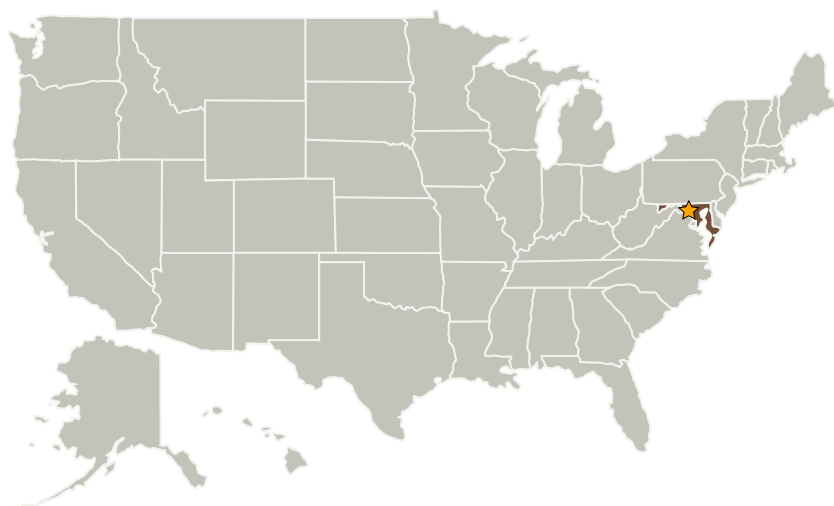
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Goddard Space Flight Center (GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

Wesley A Powell

Principal Investigator:

George Suarez Martinez

Co-Investigator:

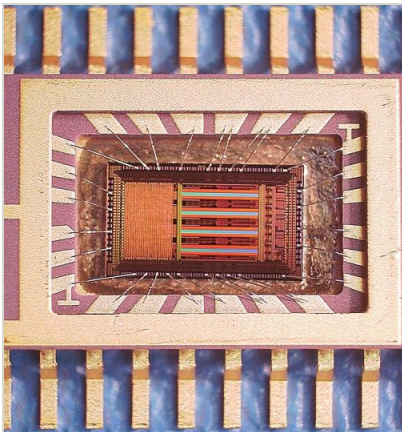
Jeffrey J Du Monthier

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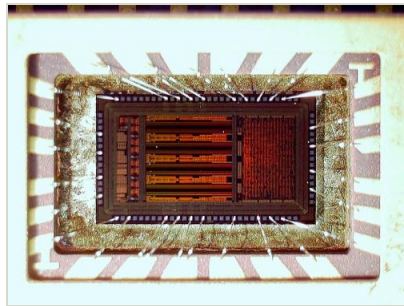


Images



RH-DAC10

RH-DAC10 die photo
(<https://techport.nasa.gov/image/2382>)



RH-DAC12

RH-DAC12 die photo
(<https://techport.nasa.gov/image/2689>)

Links

GSC-16945-1
(<https://ntts.arc.nasa.gov/app/>)

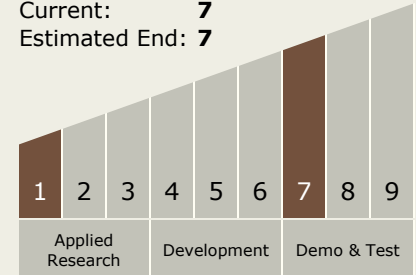
GSC-16989-1
(<https://ntts.arc.nasa.gov/app/>)

Project Website:

<http://aetd.gsfc.nasa.gov/>

Technology Maturity (TRL)

Start: **1**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.1 Avionics Component Technologies
 - └ TX02.1.6 Radiation Hardened ASIC Technologies